

**The Legacy of Colonialism**  
*Institutions, Endowments and Inequality*

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## **Introduction**

The legacy of colonialism has been the subject of many contemporary investigations into the sources of the income divergence that characterizes the global economy today. In a comparative analysis of the varying strategies employed in European conquest and settlement, it becomes all the more clear that history has played a pivotal role in the persisting underdevelopment of many former colonies. Natural resource endowments and the feasibility of settlement motivated a distinctive approach to colonization based on the particular location and environment. Where the European colonizers encountered adversity in establishing a permanent settlement, the colonial relationship was characterized by exploitation. Where European colonizers encountered valuable geographic endowments in cash crops and mineral reserves, relations between colony and colonizer were likewise formulated to serve extraction purposes. Recent empirical literature has focused on the enduring impact such colonization strategies have had on modern institutions, path dependency, and economic performance. This study differs, however, by attempting to identify the way in which such exploitative colonization strategies can explain income inequality prevalent in these societies today. I intend to look at the role of both institutions and endowments in shaping the modern income distribution within former colonies.

Using the model proposed by Easterly and Levine (2003) as a foundation, I run a two-stage least squares regression using settler mortality rates and tropical location as instrumental variables for institutions and the GINI Index as a measurement of income inequality. I begin in the next section with an overview of the relationship between evolution of institutions and inequality in developing countries, outlining some of the major contributions to the literature on endowment theory and institution theory. This is followed by a discussion of persistence of institutions in the post-colonial state. Section IV describes the model employed in the regression, explaining the inclusion and relevance of the variables, the data sources, and econometric specification. Section IV discusses the results of the regression, and suggests interesting points for further exploration.

## **The Evolution of Institutions and Inequality**

### *Colonization Strategy and Institutions*

The motivation to look at the relationship between colonial institutions, modern institutions, and income inequality arises from the Acemoglu, Johnson, and Robinson (2001) premise that different types of colonization policies produced different sets of institutions, and that these institutions endured over time. The feasibility of settlement, measured by settler mortality rates, determined the nature of the colonization strategy. On the one hand, European settlements experiencing low settler mortality rates sought to establish institutions that were reflective of European ideas of governance, with checks on the power on the State and protection of private property rights. The authors classify these types of settlements as 'Neo-Europes' and offer New Zealand, Australia, Canada and the United States as illustrative examples.

On the other hand, where settlers faced high mortality rates, it was far more common for the Europeans to set up 'extractive states,' which did not protect property rights or impart mechanisms to defend the people against government power. The primary objective of these extractive settlements was to engage in rent-seeking activities, expropriating resources and wealth from the colony in order to empower the colonizer with profitable enterprises and political authority. As this asymmetrical relationship most certainly generated vast inequalities within colonial societies, it forms the foundation for this paper's argument that the correlation between weak institutions and income inequality originates in the nature of the colonization strategy.

### *Endowment Theory*

Engerman and Sokoloff (1997) and Sokoloff and Engerman (2000) offer a different line of reasoning to explain the evolution of extractive institutions in settler colonies. The authors instead consider the critical role of endowments in shaping institutional development. Looking at the differing colonization strategies employed

in the Americas, they examine the relationship between initial endowments at the time of colonization and institutional inequalities that still persist today. The Engerman-Sokoloff hypothesis maintains that the natural resource endowments of Latin America, as opposed to those of North America, were more conducive to the production of commodities exploiting economies of scale, and thus required indigenous or imported slave labor. Having a comparative advantage in the cultivation of 'cash crops' such as bananas, sugar cane, rice, and coffee, and of valuable minerals like silver and gold, Latin American colonies were enormously profitable to imperial Europe as extractive states. Therefore, the European colonizers set up political and legal institutions to concentrate wealth and power in the hands of a small, landowning elite so as to reinforce structural inequalities and guarantee a steady supply of cheap labor to their plantations and mines.

In contrast, the geographic and factor endowments of North America were favored the cultivation of wheat on small family farms, which predisposed these colonial settlements towards more equal distributions of income, a greater proportion of European immigrants in the population, and thus more homogeneous and egalitarian societies. Without a potential for rent-seeking activities, colonizers had little incentive to impose repressive institutions on the population and consolidate political authority in the hands of a small elite. Institutional development in these colonies therefore corresponded to the consequent socioeconomic structure that arose from a different initial resource endowment. Engerman and Sokoloff conclude that the degree of inequality – in wealth, human capital, and political power – is largely accountable for the differences in economic performance among former New World colonies, and that endowments indeed had a fundamental role in shaping these unequal economic and political institutions.

Building on the Engerman-Sokoloff endowment hypothesis, Frankema (2006) finds that post-colonial levels of land inequality likewise originate from the various colonization strategies adopted by Europeans. Frankema, however, distinguishes between two types of extractive institutions corresponding to the interaction of settler conditions and resource endowments. Whereas in Latin American colonies scale-intensive commodity production generated coercive labor

institutions through concentrated land ownership, in many parts of Africa the colonizers pursued rent-seeking activities outside the production process because of unfavorable settler conditions. Hence exploitation in the African colonies primarily took the form of taxation and government expropriation of valuable resources, most notably the slave trade, as opposed to directly influencing socioeconomic structures through control of land distribution. This distinction is essential to understanding the different patterns of colonization in the Americas and Africa.

In order to test the effect of commodity endowments on long-run development, Easterly (2007) constructs an instrument for inequality based on the suitability of land for the cultivation of wheat versus sugarcane. Citing the Engerman-Sokoloff premise that inequality can be traced to colonial factor endowments, Easterly argues that the ratio of wheat to sugarcane captures the differing levels of structural inequality established by colonial institutions. Sugar, as the primary example of a commodity featuring economies of scale in production, serves as a representative endowment for the case of colonies where resource extraction generated lasting inequality. In contrast, wheat provides a fitting example of a commodity associated with equality, as its production in colonies mainly took place on small family farms. Thus, comparing the relative endowments of these two crops offers a natural measurement for the degree of inequality that can be linked to long-run development in former colonies. While disregarding the importance of other natural resource endowments that also lent themselves to extractive activities, the Easterly instrument enables a more concentrated examination of the relationship between endowments and inequality and an innovative method for the comparison of the colonial experience.

In addition to its influence on natural resources, geography can also impact development through its spatial dimension. A second component of endowment theory relates to geographical location, namely, the impact of tropical environments on development. This concept was first developed by Sachs and Warner (1995, 1997) in their analysis of natural resource abundance and its implications for long-run growth. Because tropical climates pose limitations on productive capacities, and

may also discourage settlement due to their inhospitable disease environments, underdevelopment is common to countries that are closer to the equator. Many economists have incorporated differences in geography as a factor in explaining the income levels of developing countries. Woods (2004) describes environmental conditions in the tropics as a 'tax' on growth in that history has seen these regions burdened by higher transportation costs, adverse effects of climate on production, and lagged technological advancement. He notes that among countries in the tropics, only four – Hong Kong, Singapore, Taiwan, and Mauritius – have managed to overcome their unfavorable geographic conditions, and attributes these exceptions to success in developing the human capital of the population.

Although it is clear that both institutions and geography have an impact on long-run development, the question remains as to the causal relationship behind these two determinants. Easterly and Levine (2003) test both the institutions and endowment hypotheses using cross country evidence, controlling for legal origin, religious composition, and ethnic diversity. They conclude that it is only through institutions, and not through any direct effect on income, that endowments affect development. Their results indicate strong support for Acemoglu's argument that institutions are what truly matter in determining cross country variation in income levels. Having such a critical influence on income variation, institutional development deserves further exploration in the context of both its reinforcement of existing inequalities and its persistence over time. The next section discusses the relation between colonial institutions and modern institutions, which is central to the colonial legacy.

### **Persisting Institutions and Inequality**

Fundamental to both the Acemoglu and Engerman-Sokoloff hypotheses is the contention that colonial institutions persisted even after independence. As post-colonial institutions bore great resemblance to colonial institutions, the degree of inequality initially established under colonial rule endured thereafter. The 'Neo-Europes' evolved into more democratic post-colonial institutions, where the

government enforced private property rights and the rule of law. In this case, the egalitarian income distribution and largely homogeneous population of European immigrants served to unite settlers in the struggle for independence; the governments that were set up after these colonies achieved independence were reflective of this common commitment. The United States provides a fitting example of a society in which the post-colonial government built on a pre-existing societal commitment to defending private property, democratic principles, and checks on the power of the State. Looking at current-day institutions in these countries, it is easy to see how colonial institutions formed a strong foundation that facilitated stability and continuity.

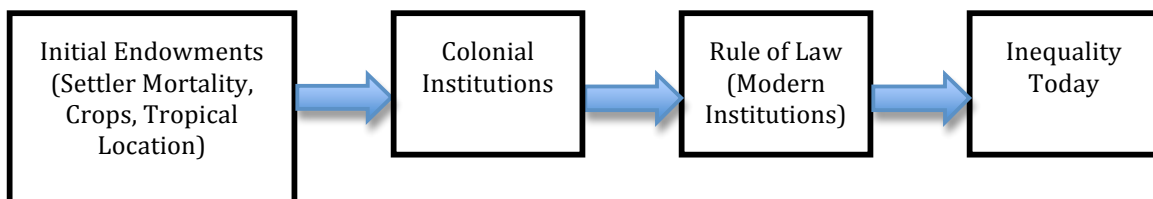
At the other extreme, extractive colonies remained intact with the consolidation of power by a small governing elite. In these societies, because colonial institutions had already solidified mechanisms to enable the extraction of resources, the post-colonial successor governments could readily exploit pre-existing structures to their own benefit. Those who assumed power after gaining independence might have seen themselves disadvantaged by an institutional overhaul, or had little incentive to pay the costs of investing in better institutions. Additionally, the transfer of power most often implied the new elite had some association to the old colonial regime, in which case their interests were similarly aligned to favor extractive institutions. As argued in the aforementioned studies of the persistence of land inequality in Latin America, the lasting legacy of colonialism is still evident in the concentration of both political and economic power by a small ruling class in many of the former Spanish colonies.

The most obvious way in which institutions affect inequality is through the interaction between political and economic structures. In the absence of strong institutions to enforce private property rights, contracts, and other legal mechanisms, instability and resulting uncertainty discourage risk and crowd out investment. Thus, weak institutions depress growth through their negative impact on capital accumulation, production capacity, and trade integration. Chong and Gradstein (2007) find evidence of a double causality between income inequality and institutional quality. On the one hand, income inequality implies that a wealthy elite

can wield considerable power against the adoption of more equitable institutions. On the other hand, poor institutional quality allows those in power to reinforce inequality to their own benefit. While the double causality argument is outside the scope of this paper, it nonetheless provides support for the idea that the complex relationship between income inequality and institutional quality facilitates continuity and therefore confirms the persistence of colonial institutions over time. The model used in this paper is based on this persistence, and the next section describes the setup in greater detail.

### Data and Model

Building on earlier studies that examined the causal relationship between endowments, institutions, and variations in income across countries, my objective is to identify whether or not a similar relationship exists between these determinants and inequality. More specifically, I intend to estimate the effect of institutions on inequality using initial endowments as an instrumental variable for colonial institutions. The hypothesis is conceptualized in the following illustration.



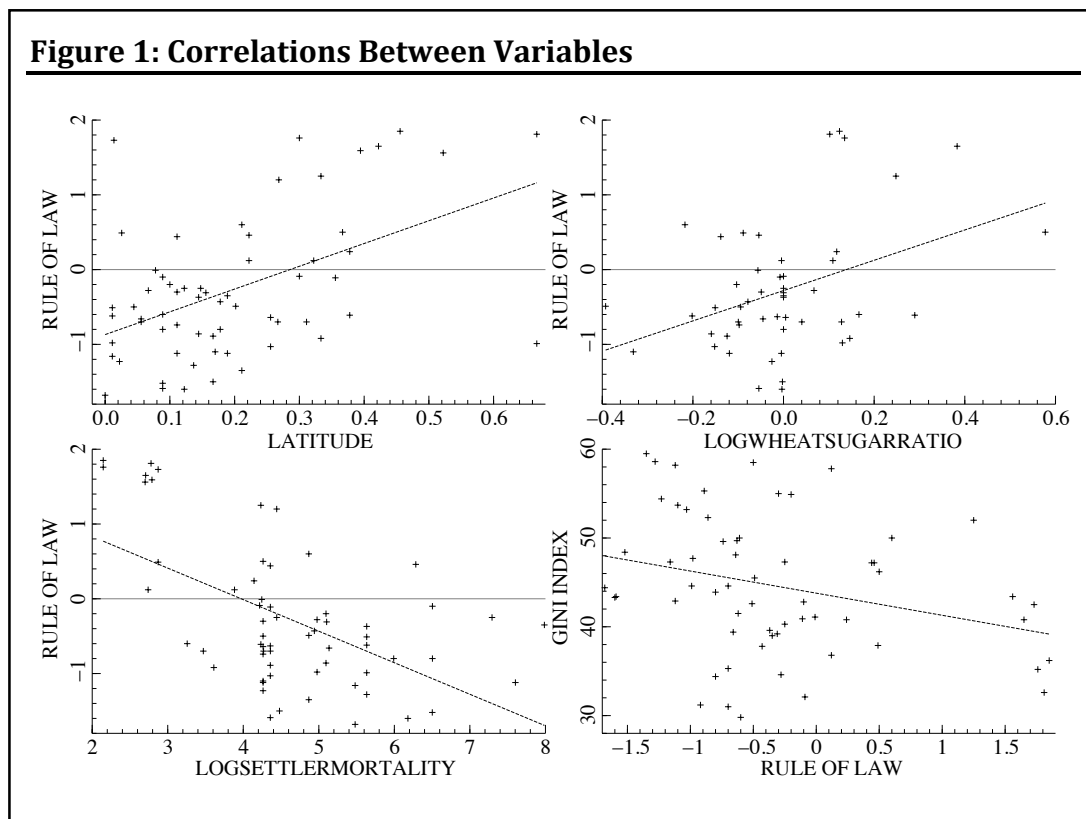
The model applied in this paper is based on the two-stage least-squares regression used by Easterly and Levine (2003). The first stage regresses the endowment variables - settler mortality rate, latitude, and crops (the ratio of land suitable for wheat versus sugar) - on the rule of law variable.

$$(1) \quad \text{Rule of Law} = \beta + \delta'(\text{Settler Mortality}) + \gamma'(\text{Latitude}) + \rho'(\text{Crops}) + v;$$

In order to use settler mortality, latitude, and crops as valid instruments, they must be correlated with rule of law but have no effect on income inequality except for through their effect on institutions. It is difficult to construct a scenario in which the mortality rates of European settlers have a direct effect on modern income inequality. One could imagine that colonial mortality is somehow related to modern mortality and that this might affect income inequality today. However, this is highly unlikely as there is no logical association between the mortality of Europeans during colonial times and those of the population today. Furthermore, there would also have to exist an association between mortality today and income inequality. Latitude is also a strong instrument in that it is difficult to envision its effect on inequality except through its role as a geographic determinant of institutions. In order to have a direct effect on income distribution, tropical location would have to in itself determine the extent of inequality in a country. This would be a very far-fetched argument. Finally, the validity of the wheat-sugar endowment ratio is questionable, considering its use as an instrument for inequality in the literature. I thus exclude this variable from the first stage.

The variable for rule of law is an index between -2.5 and +2.5 provided by the World Governance Indicator Project. It reflects the perception of confidence in the rules of society and the extent to which people abide by them and more specifically, the quality of contract enforcement, property rights, and law enforcement. I use this index as a measurement for the quality of institutions. The Acemoglu paper provides the data on mortality of European settlers, calculated as the logarithm of annual deaths per 1,000 soldiers. This variable is intended to capture the feasibility of settlement in different colonies. As pictured below, settler mortality is negatively correlated with rule of law. This is intuitive and confirms that a low feasibility of settlement (high mortality rate) corresponds to poor institutions (weak rule of law). The latitude variable, from La Porta (1999), is the absolute value of latitude of the country, scaled between 0 and 1, where 0 is the equator. This variable is intended to capture the effect of tropical location. Latitude exhibits a positive correlation with rule of law, as depicted in the graph below. This would seem to confirm that

proximity to the equator, or rather a more tropical environment, corresponds to weaker institutions. The variable for crops is the logarithm of the ratio of land suitable for wheat versus sugar ratio calculated by Easterly (2007). I include this variable to control for the effect of natural resource endowments. As previously explained, this ratio aims to provide a measurement of relative commodity endowments; land that is more suitable for wheat production should be associated with better institutions, whereas lands that is more suitable for sugarcane production should be associated with weaker institutions. This relationship is verified in the figure below.



The Gini Index of Income Inequality is taken from the 2009 Human Development Report<sup>1</sup> published by the United Nations Development Program. The more unequal the distribution of income, the higher will be the value of the Gini coefficient. In a society where income is distributed perfectly equally, the Gini coefficient takes on a

<sup>1</sup> Coefficients for Sudan and the Bahamas were not available. They are omitted from the sample.

value of 0; a Gini coefficient of 1 would imply that income is distributed as unequally as possible and all of the wealth in society is concentrated in one single household. The second stage regresses the GINI Income Inequality Index on the fitted values for rule of law estimated by the first stage of the regression.

$$(2) \quad \text{GINI Index} = \alpha'(\text{Rule of Law}) + u;$$

This method of two-stage least-squares tests whether the component of institutions determined by exogenous endowments explains cross-country differences in income inequality. If  $\alpha$  is significant, then this suggests that endowments influence inequality through institutions.

## Results

<b>Table 1: Two-Stage Least-Squares Regressions</b>		
(First Stage) Dependent Variable: Rule of Law		
	<u>Full Sample</u>	<u>Without Neo-Europes</u>
Settler Mortality	-0.17 (-5.13)	-0.16 (-5.29)
Latitude	2.62 (3.76)	1.99 (3.15)
(Second Stage) Dependent Variable: GINI Index		
Rule of Law	-2.76 (-1.44)	-0.85 (-0.30)

Looking at the results for the full sample, the coefficient  $\alpha$  on Rule of Law in the second stage of the regression was only marginally significant at the 1 percent level with a p-value of -1.44. This could be attributed to the small sample size, but it also brings into question whether there are other forces at work through which institutions affect inequality. For instance, not all inequality is persistent over time, and in some cases income inequality is a more modern development. The United States is an appropriate example; while falling into the Neo-Europe category in which better institutions evolved, its Gini coefficient is relatively high with a value of 40.8. Perhaps a more fitting test would be to isolate the countries that were demonstrative of the extractive colonial experience. Therefore, as an alternative regression I apply the same two-stage least-squares methodology to a sample excluding the Neo-Europes. However, in this case  $\alpha$  becomes even less significant with a t-value of -.30.

Based on the results of the regression, I therefore conclude that there is little support for my hypothesis that endowments influence inequality through institutions. Further exploration of this hypothesis could incorporate a strong, valid instrument for natural resource endowments in order to strengthen the set of variables used to account for geographic endowments. Alternatively, one could find a new instrument for colonial institutions that does not relate to geographic endowments. For example, if it were possible to find some measurement of income inequality in colonial society, then identifying extent to which inequality and institutions persist in the post-colonial state would be easier. This could be augmented by a time series analysis of the interaction between the two variables over time. The previously mentioned study by Chong and Gradstein provides a good starting point to examine this dynamic relationship.

How does my conclusion relate to the previous literature confirming the relationship between endowments, institutions, and income? This requires relating income inequality to the aforementioned evidence of differences in income per capita across nations. While some economists argue that persisting structural

inequality can explain the 'poverty trap' in the developing world, having a negative impact on income, others believe certain levels of inequality can facilitate income growth. The empirical evidence is mixed, and the sample of former colonies in this study suggests the relationship is not so definitive. Kuznets (1955) proposes an alternative hypothesis that the pattern of cross country variations in income levels and income inequality. This theory predicts that the pattern follows an inverted U-shaped curve, as income inequality will first rise and then fall as a country develops over time. However, empirical evidence suggests that this holds true only across countries and not within countries over time. In the sample considered in this paper, a graph of income inequality and GDP per capita could potentially provide support for the existence of the Kuznets curve. However, as within country variation in income inequality is outside the scope of this study, this could be a topic for further exploration.

## **Conclusion**

Many empirical studies have examined the legacy of colonialism and the relationship between endowments, institutions, and long-run paths of development. As the proposed theories were based on the premise that differing colonization strategies caused inequality in both economic and institutional structures, it was my intention to test whether such inequality persisted over time through its effect on institutions. I did not find evidence to support my hypothesis, which could imply that there are other mechanisms through which institutions affect inequality. Hence, while the causal relationship between colonial institutions and modern institutions can explain variations in income across countries, I conclude that it does not explain variation in income inequality across the countries examined in this study.

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## Appendix

**Table 2: Descriptive Statistics**

<u>Variable</u>	<u>Observations</u>	<u>Minimum</u>	<u>Mean</u>	<u>Maximum</u>	<u>Std. Dev.</u>
GINI	64	29.8	44.525	59.5	7.626
SETTLERMORTALITY	61	2.1459	4.6467	7.9862	1.2427
RULE OF LAW	63	-1.68	-.2746	1.85	0.93661
LATITUDE	63	0	.19551	.6667	.15064
LOGWHEATSUGARRATIO	51	-.3926	-.00228	.5775	.16107